

Emerging Technologies in Underground Coal Mining

By

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Abstract

New technologies continue to emerge in the coal mining industry in response to the push for increased efficiency, productivity, and product quality, while trying to maintain a prominent position in the delivery of energy. New technologies also respond to needs for meeting stricter regulations. And the application and implementation of new technologies in mining is essential to addressing health and safety hazards to the worker through measurement, control, and protective devices. With the introduction of emerging technologies, there is a need to better understand them and their effects on the mining industry. This understanding is essential to keep up with the constant change and competition. But more importantly, this understanding is essential because of the potential for hazards to the worker that may be presented by the emerging technologies themselves.

At the National Institutes for Occupation Safety and Health (NIOSH), Pittsburgh Research Laboratory (PRL), we are concerned with the potential for hazards created or enhanced by emerging technologies within the coal mining industry. We are addressing this concern through our research in two ways. One of our new research projects has the explicit objectives of identifying the emerging technologies in the mining industry and determining the associated or potential hazards posed to the worker, thereby compromising his health and safety on the job.

The focus of this first year of research is specifically on the underground coal segment of the mining industry. Secondly, we have a number of research projects addressing specific emerging technologies which have already been identified. Some of these projects include: the study of hazards associated with extended-cut mining methods, establishment of safe operating characteristics (intrinsic safety) of lasers and laser-based devices in methane-air atmospheres, establishment of functional safety guidelines for processor-based mining systems and devices, development of a remote optical methane sensor, and investigation of diesel engine emission measurement and protection, to name a few. This paper will provide an overview of current NIOSH research efforts in emerging technologies in mining.